

## APPENDIX 1: ENERGY SECTOR

### Sector Description

The energy sector represents a union between cyber control and monitoring systems, physical facilities, and the people that have the sector-specific knowledge base. Within Region 6, the energy sector is divided into four segments in the context of critical infrastructure protection: (1) electricity, (2) oil and natural gas, (3) dams, and (4) nuclear power. Electric generation assets include fossil fuel plants and hydroelectric dams, substations, transmission and distribution networks linking areas of the Western United States regional grid, and control and communication systems operating and monitoring critical infrastructure components. The oil infrastructure consists of oil production; crude oil transport; refining and processing; transport, holding, and distribution of refined products and petroleum-derived fuels; and control and other external support systems. The natural gas industry consists of exploration and production, storage, transmission, and local distribution. For both oil and natural gas, many miles of pipeline span the Region and move a variety of substances, including crude oil, refined petroleum products and natural gas. Dams are major components of critical infrastructure systems that provide water and electricity to large populations, cities, and agricultural complexes. Dams in the Region belong to the Federal, State or local governments, utilities, and corporate or private owners. Although Region 6 has no nuclear reactors within its boundaries, this sector also includes non-power related nuclear reactors used for research, testing, and training; nuclear materials in medical, industrial, and academic settings, and facilities that fabricate nuclear fuel; and the transportation, storage, and disposal of nuclear materials and waste.

### Results of Infrastructure Interruptions

Insufficient quantities of power can significantly impact:

- The regional economy (e.g., the Northeast Blackout of August 2003 caused several billion dollars in losses to the northeastern and national economies)
- Public safety (e.g., law enforcement, fire suppression, traffic control)
- Communications systems (e.g., telephone, radio, and data)
- Public information (e.g., commercial television and radio)
- Water and natural gas delivery systems
- Storm water and sewage treatment systems
- Public health (e.g., hospitals and convalescent homes, life support for patients outside of medical facilities).

The loss of oil supply to the Region, either by disruption in transportation nodes or pipeline interruptions, would severely limit the ability of suppliers to provide energy, leading to the impacts listed above. Many power generating facilities are oil burning and would be unable to produce energy. Furthermore, the supply of oil based products, such as gasoline for vehicles, would be interrupted.

Damage to a natural gas pipeline that results in natural gas escaping into the atmosphere could pose a threat to the health, safety, and property of the citizens of Region 6. This threat is due to the potential for explosion and/or fire caused by the ignition of escaping natural gas. The

inability to deliver sufficient quantities of natural gas could impact the private and public sectors' space heating, water heating and cooking capabilities. The reduced capability of space heating over an extended period of time in the colder months of the year would pose a health threat to those portions of the population that would be more vulnerable to sustained colder temperatures, mainly the elderly, those in poor health and infants.

The inability to deliver sufficient quantities of natural gas to hospitals and food service providers that use natural gas to heat water and produce steam could impact their sterilization practices. The inability to deliver sufficient quantities of natural gas to electric power producers who use natural gas in the production of electricity and do not have adequate alternate fuel capabilities could impact grid reliability in the Region. Problems with the system of private pipelines in the Region can also disrupt transportation by impeding the delivery of crude oil, gas, and steam affecting the supply of gasoline for motor vehicles and the heating of buildings.

#### Region 6 Service Providers Active in CIP

- Bonneville Power Administration
- British Petroleum – Olympic Pipeline
- Puget Sound Energy
- Seattle City Light
- Williams Gas Pipeline

#### Current Information Sharing Mechanisms

- Energy Information Sharing and Analysis Center (EISAC), (email: [energyisac@api.org](mailto:energyisac@api.org))
- North American Electric Reliability Council (NERC), (<http://www.nerc.com>)
- Federal Energy Regulatory Commission (FERC), (<http://www.ferc.gov>)
- Nuclear Regulatory Commission (NRC), (<http://www.nrc.gov>)
- Pacific Northwest Economic Region (PNWER), (<http://www.pnwer.org>)
- Western Electric Coordinating Council (WECC), (<http://www.wecc.biz>)
- NWWARN, (<https://www.nwwarn.gov>)

#### Common Vulnerability Assessment Tools

*Methodologies currently available to Oil & Gas asset owners include the following:*

- AGA (American Gas Association)/INGAA (Interstate Natural Gas Association of America) Security Guidelines
- ANL (Argonne National Laboratory) Checklist – screening tool
- API (American Petroleum Institute) /NPRA (National Petrochemical and Refiners Association) SVA (Security Vulnerability Analysis)
- Coast Guard Security Risk Guidelines
- ExxonMobil SVA
- IORTA (Information Operations Red Team Assessment) – external team from SNL will perform comprehensive physical and cyber analysis
- LLNL (Lawrence Livermore National Laboratory) VA Capability – external team from LLNL will perform comprehensive physical and cyber analysis

*Methods that can potentially be tailored to oil & gas assets include:*

- AS/NZS (Australia/New Zealand) Risk Management Guideline 4360:2004
- CARVER + Shock VAM – widely-used screening tool
- CCPS (Center for Chemical Process Safety) SVA or its computerized version SVA-Pro-geared towards facilities that handle hazardous chemicals
- North Carolina Terrorism VSAT (Vulnerability Self-Assessment Tool)
- RAMCAP (Risk Assessment Methodology for Critical Asset Protection)
- VAM-CF<sup>TM</sup> (Vulnerability Assessment Methodology – Chemical Facilities)

*Methodologies currently available to Electricity asset owners include the following:*

- ANL Checklist (screening tool)
- ANL VAM (prepared for DOE) – comprehensive VA methodology
- IORTA (Information Operations Red Team Assessment) – team from SNL will perform comprehensive physical and cyber analysis
- LLNL (Lawrence Livermore National Laboratory) VA Capability – team from LLNL will perform comprehensive physical and cyber analysis
- MSRA (Matrix Security Risk Analysis Methodology) – hydroelectric dams
- Nuclear Power Plant Vulnerability
- NUREG/CR-2297 (also for nuclear power plants)
- RAM-D (hydro-electric dams)
- RAM-T (transmission systems)
- Edison Electric Institute (EEI) Security Committee Approach to Risk/Vulnerability Assessment

*The following methodologies can potentially be tailored to assets in the electricity sector:*

- AS/NZS Risk Management Guideline
- CARVER + Shock VAM
- CCPS SVA or SVA -Pro
- IORTA (Information Operations Red Team Assessment) – external team from SNL will perform comprehensive physical and cyber analysis
- LLNL (Lawrence Livermore National Laboratory) VA Capability – external team from LLNL will perform comprehensive physical and cyber analysis
- North Carolina Terrorism VSAT
- RAMCAP

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